



**AAM6000EV ADSL Modem**

**User's Manual**

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Product Name:	<b>AAM6000EV ADSL Modem</b>
Manual Revision:	<b>1.00 E585</b>
Release Date:	<b>August 2000</b>

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# 1. Introduction

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## 1.1 Overview

Thank you for purchasing the ASUS AAM6000EV ADSL modem. This ADSL modem delivers the highest performance in Asymmetric Digital Subscriber Line technology, allowing you to simultaneously enjoy the telephone and Internet service using existing copper phone lines. Ideal for home and small business users, this easy-to-use communication device offers reliable connectivity as well as remarkable data transfer rates--up to 8Mbps downstream and 640Kbps upstream. Once the ADSL Modem is powered up, you are always online to enjoy real-time 3D animation, video conferencing, or perform other data intensive operations.

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## 1.2 Features



### Standards Compliance

- ANSI T1.413 Issue 2 compliant
- ITU-T G.992.1 (G.dmt) compliant: up to 8Mbps downstream and 640Kbps upstream data rate
- ITU-T G.992.2 (G.lite) compliant: supports splitter-less implementation and up to 1.5Mbps downstream and 512Kbps upstream data rate
- ITU-T G.994.1 (G.hs), G.996.1 (G.test), and G.997.1 (G.ploam) support via software upgrade as standards approved by ITU-T

### Hardware Features

- Interoperable with Alcatel, Cisco, Lucent, and other DSLAMs
- Supports 8 bits of VPI and 16 bits of VCI address range
- Capable of transmitting data up to 19,000 feet

### Software Features

- Supports RFC 2364 protocol (PPP over ATM), RFC 1483 encapsulation, RFC 2516 protocol (PPP over Ethernet), and RFC 1577 protocol (classical IP over ATM)
- Firmware upgrade and configuration restoration over TFTP

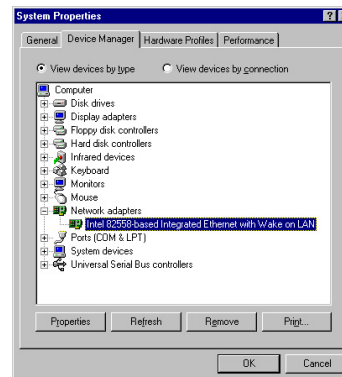
### 2.1 System Requirements

Before connecting the ADSL modem to your PC, make sure your system is equipped with an Ethernet controller and supports the TCP/IP protocol.

### 2.2 Installing a Network Card

If your system does not have an embedded Ethernet controller, you must install a network interface card as instructed below (assuming that you are using the ASUS PCI-L101 Fast Ethernet card under the operating system of Windows 98):



1. Install the PCI-L101 card on your motherboard.
2. Power up your PC and follow the **Add New Hardware Wizard**'s instructions to install the driver. When asked to restart your computer at the end of the installation, click **Yes**.
3. After restarting the system, right-click **My Computer** on the desktop, select **Properties**, click the **Device Manager** tab, and then double-click **Network adapters** to confirm that the Ethernet driver is properly installed.




## 2. Preparations

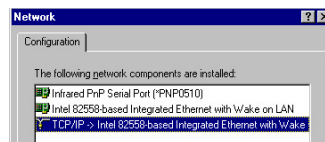
### 2.3 Installing the TCP/IP Protocol

#### • Checking if TCP/IP is already installed

1. Click the **Start** button  on the desktop. In the **Settings** menu, select **Control Panel** .

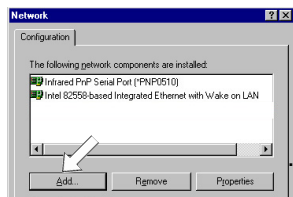
Double-click the Network icon  .

2. In the list of installed network components try to find the TCP/IP protocol. It may be followed by the name of the Ethernet controller. If you cannot locate anything that begins with **TCP/IP**, install it as described below.

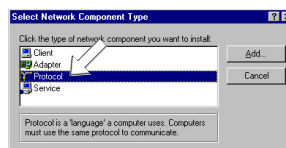


#### • Adding TCP/IP in Network properties

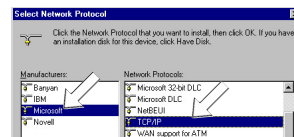
1. Click **Add**.



2. Double-click **Protocol**.



3. Select **Microsoft** from the manufacturers. In the list of network protocols browse to **TCP/IP** and then double-click it.

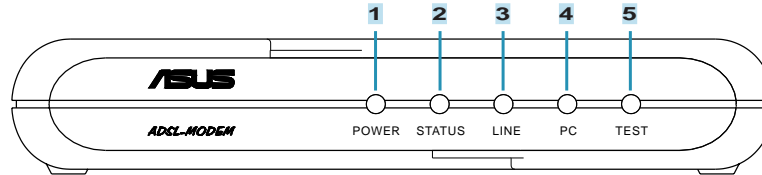


### 2.4 Changing TCP/IP Settings

After the TCP/IP protocol is installed, restart your computer and consult the installation guide provided by your telephone company to complete TCP/IP configurations.

## 3. Installing the ADSL Modem

### 3.1 Front Panel



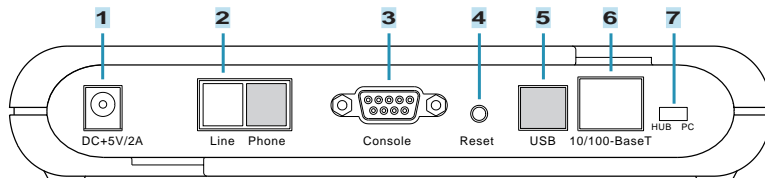
LED Indicator	State	Description
<b>1. Power LED</b>	ON	Modem is powered ON
	OFF	Modem is powered OFF
<b>2. Status LED</b> (ADSL Line Status)	ON	“Showtime”—successful connection between ADSL modem and telephone company’s network
	Flashing	“Handshaking”—modem is trying to establish a connection to telco’s network
	OFF	“Down”—ADSL line is inactivated
<b>3. Line LED</b> (WAN Traffic LED)	ON	Successful connection to telco’s network; ready for data transmission
	Flashing	Data transmitting between modem and telco’s network
	OFF	Disconnected from ADSL line; not ready for data transmission
<b>4. PC Link LED</b> (LAN Traffic LED)	ON	Successful connection between LAN and PC
	Flashing	Data transmitting between LAN and PC
	OFF	No connection between LAN and PC*
<b>5. Test</b>	ON	Error (Resetting the ADSL modem may help; if not, contact customer support)
	OFF	Normal operation

\* Check if the Ethernet cable is properly connected and the HUB-PC switch is in the correct position.

## 3. Installing the ADSL Modem

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### 3.2 Rear Panel



#### 1. DC +5V/2A Power Input Jack

The provided power adapter converts AC power to DC power for use with this jack. Power supplied through this jack will supply power to the ADSL Modem.

#### 2. Line Connector

The RJ-11 connector allows ADSL data communication between the modem and the PSTN through a twisted-pair phone wire.

#### 3. Console Port

The 9-pin D-sub serial port supports the RS-232 terminal interface for advanced ADSL modem management.

#### 4. Reset Switch

The reset button, when pressed, resets the modem without the need to unplug the power cord.

#### 5. USB Port (optional)

The optional USB port allows the modem to be connected to your computer through the USB interface.

#### 6. 10/100-BaseT Ethernet Port

The RJ-45 Ethernet port supports 10Base-T networks. (100Base-TX networks will be supported in the near future.) This port allows your PC or Ethernet hub to be connected to the ADSL Modem through a Cat. 5 Ethernet cable.



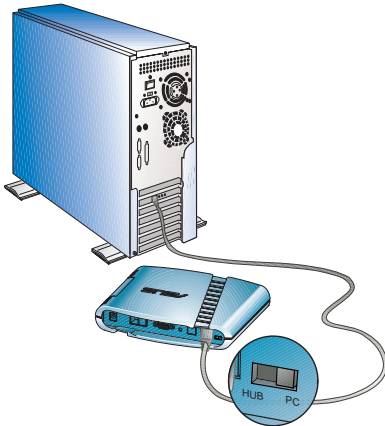
## 3. Installing the ADSL Modem

### 3.2 Rear Panel (Cont')

#### 7. HUB-PC Switch

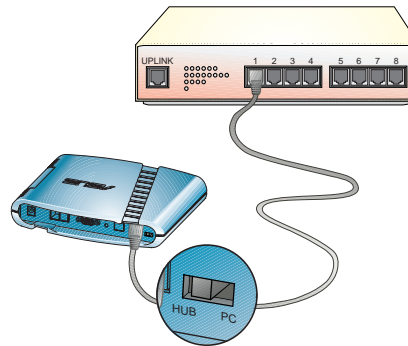
The HUB-PC switch controls the crossover function. Modem-to-PC connection must contain crossovers. When connecting the modem to a PC, leaving the switch on the default position **PC** allows you to implement crossover cabling without using a crossover cable. When connecting the modem to an Ethernet hub's RJ-45 downlink port, use a pen or screwdriver to slide the switch to **HUB** and implement straight-through cabling. If you run out of the hub's downlink ports and connect the modem to the uplink port, you must slide the switch to the position of **PC**.

Example 1. Modem to PC



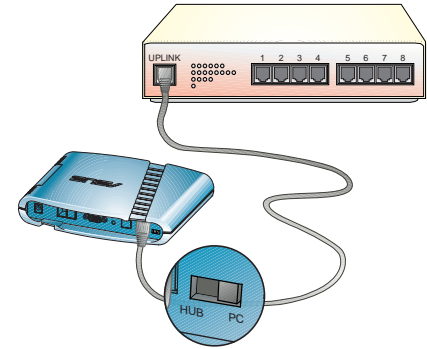
When using a PC with the modem, adjust the HUB-PC switch to the position of **PC**.

Example 2. Modem to Hub (Downlink)



When connecting the modem to an Ethernet hub's downlink port, adjust the HUB-PC switch to the position of **HUB**.

Example 3. Modem to Hub (Uplink)



When connecting the modem to an Ethernet hub's uplink port, adjust the HUB-PC switch to the position of **PC**.

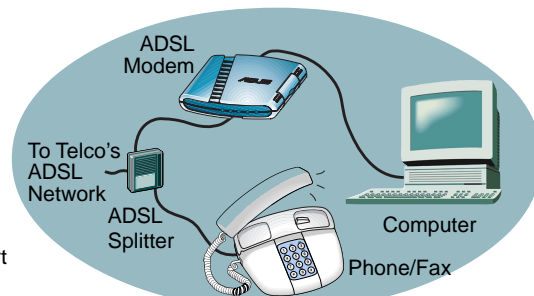
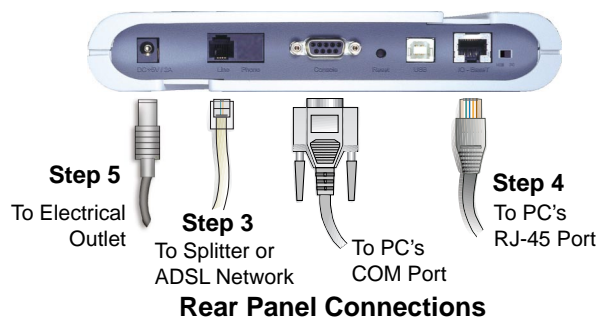
## 3. Installing the ADSL Modem

### 3.3 Connecting the ADSL Modem

Take the following steps to accomplish the installation procedure:

1. Connect the ADSL cable to the line connector of an ADSL POTS splitter.
2. Connect a telephone cable from the phone connector of the splitter to your telephone.
3. Use another telephone cable to connect the modem connector of the splitter and the **Line** connector on the rear panel of the ADSL modem.
4. Connect the Ethernet cable from the RJ-45 port on your computer to the Ethernet port on the ADSL Modem. Make sure the HUB-PC switch is in the correct position.
5. Connect the AC power adapter to the DC +5V/2A input jack on the ADSL Modem. Plug in the AC power adapter to an electrical outlet.

**NOTE:** If you are not using a telephone or fax machine on the ADSL line, skip steps 1 to 3 and connect the ADSL cable directly to the **Line** connector on the rear panel of the ADSL Modem.



### 3.4 Powering Up

When all connections have been properly made and the power is ON, the ADSL modem will automatically start the self-test and log on to your phone company's ADSL network. For new modems, please go through the configuration as detailed in the following section, and then you are all set and ready to enjoy the Internet services at a marvelous speed!

## 4. Configuring the ADSL Modem

### 4.1 COM Port Configuration



Hyperterm

#### Recommended COM Port Settings:

Bit Rate: 9600 bps

Data Bits: 8

Parity Check: None

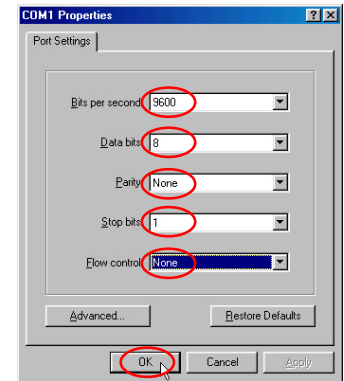
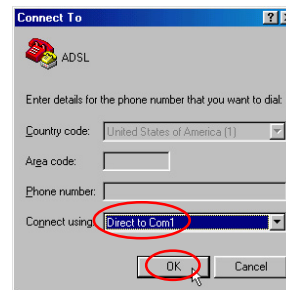
Stop Bit: 1

Flow Control: None

For advanced modem management, use a serial cable to connect the Console port on the ADSL modem to your PC's empty COM port. (See the illustration in **3.3 Connecting the ADSL Modem**.) Open a VT100 terminal emulation program such as NetTerm or Windows' HyperTerminal to configure the COM port. (The setup under HyperTerminal is given as an example below.)

In Windows, click **Start, Programs, Accessories, Communications**, and then select **HyperTerminal**. When the HyperTerminal window appears, double click on the HyperTerminal icon to run it. If you cannot find it, add the program using **Add/Remove Programs** in Control Panel.

1. When HyperTerminal is started, you will be prompted to establish a new connection. Follow the onscreen instruction.
2. For ADSL connections, you do not have to enter dial-up information. Simply choose the COM port that you are using and then click OK.
3. Configure the COM port as shown below.



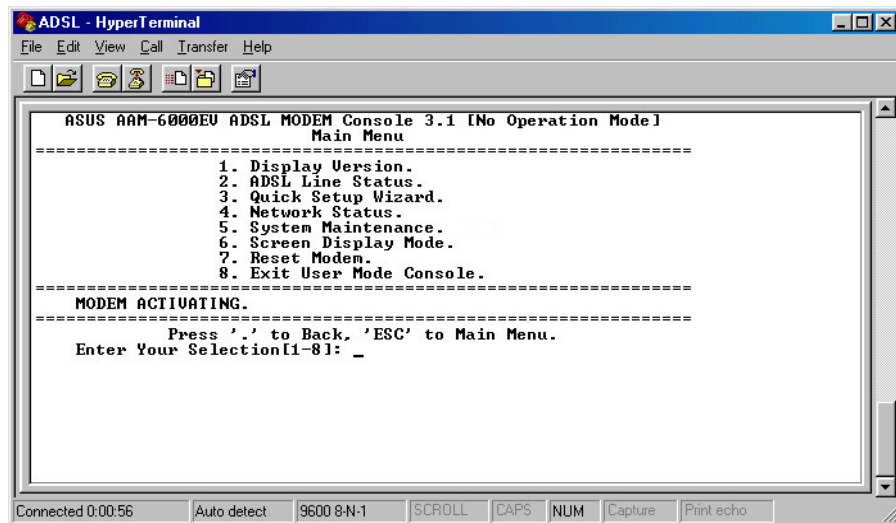
## 4. Configuring the ADSL Modem

### 4.2 Operation Mode Configuration



**NOTE:** Because the software for the AAM6000EV is constantly being updated, the following console screens and descriptions are for reference purposes only and may not reflect your console screens exactly.

After the COM port is properly configured, select an operation mode for the ADSL modem in the terminal emulation program. If you have established an ADSL connection as demonstrated in **4.1 COM Port Configuration**, you may evoke the Main Menu of the AAM6000EV ADSL Modem Console by placing the pointer in the white area of HyperTerminal and then pressing <Enter>. The Main Menu of the Console will appear as follows:



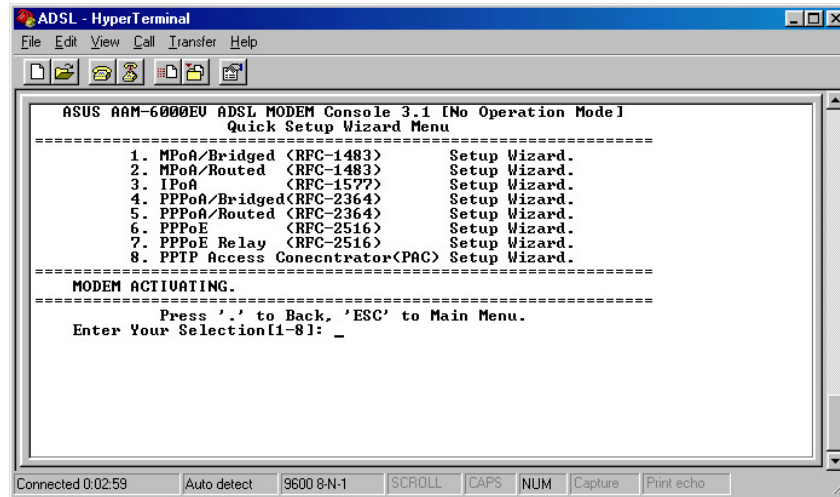
Key in **3** in the Main Menu to start the Quick Setup Wizard.

**Troubleshooting:** If the Main Menu does not show up after pressing <Enter>, reset the modem and then try again.

## 4. Configuring the ADSL Modem

### 4.2 Operation Mode Configuration (Cont')

In Quick Setup Wizard, eight console operation modes are provided for your ADSL modem configuration. Refer to your ADSL service manual or consult your phone company before selecting the mode. The configuration procedure for each mode will be detailed on the following pages. If you are not sure about certain setup fields, leave on the default setting.



#### • Symbols

To complete certain configurations, you should be aware of two symbols used throughout this manual.



**Telco Define:** Information should be provided by your phone company.

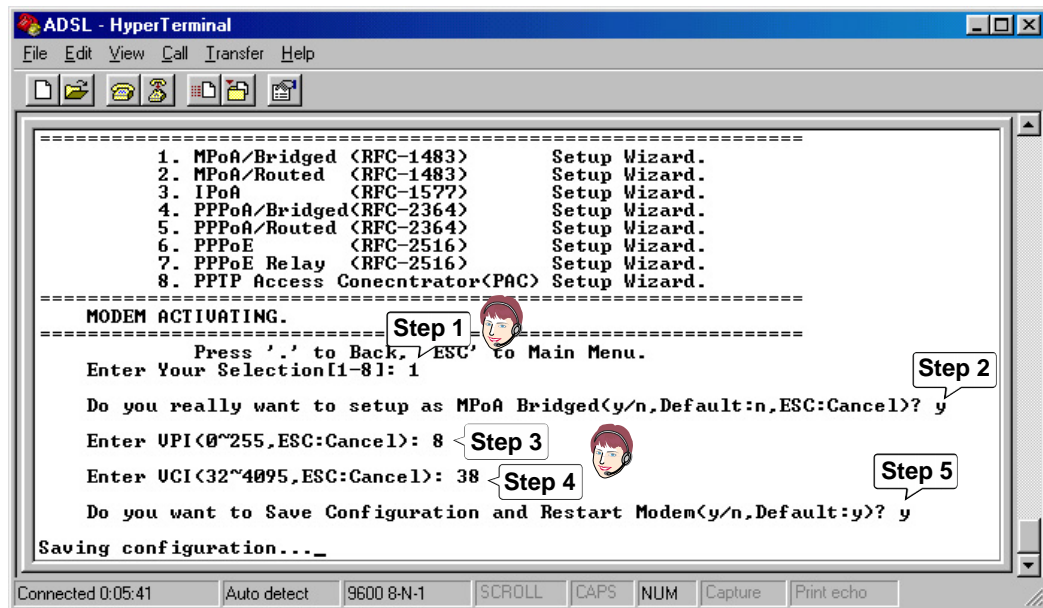


**User Define:** You may enter the information required either as you wish or according to your own environment.

## 4. Configuring the ADSL Modem

### 4.2.1 MPoA/Bridged <RFC-1483> Enter 1 in the Quick Setup Wizard to set up MPoA/Bridged mode.

MPoA/Bridged mode complies with IETF RFC-1483 Multiprotocol Encapsulation over ATM Adaptation Layer 5. In this mode, the modem acts as a bridging device.

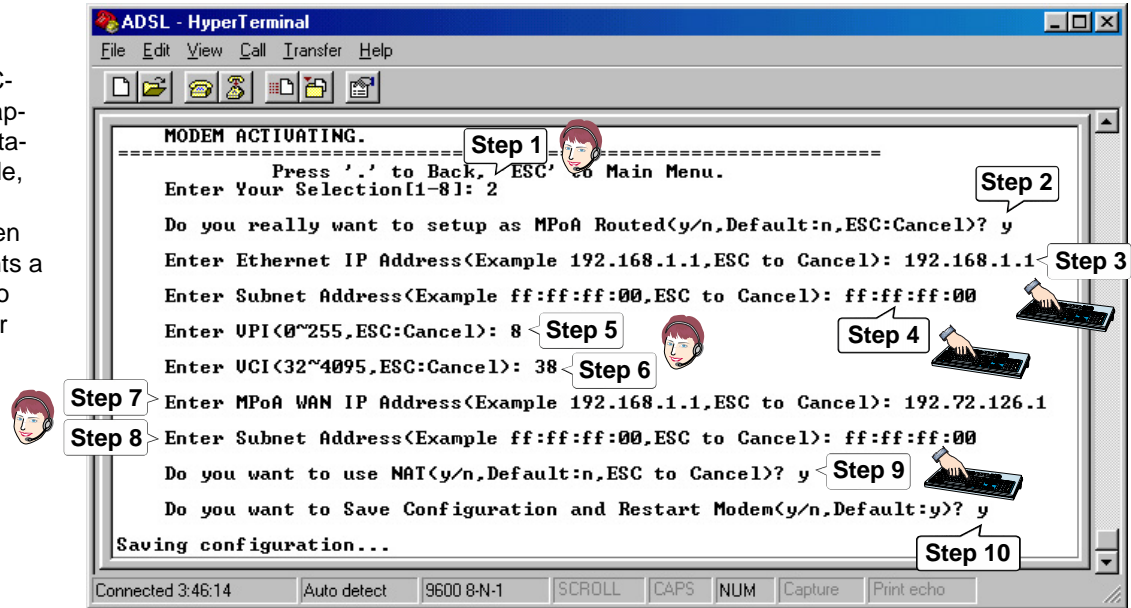


## 4. Configuring the ADSL Modem

### 4.2.2 MPoA/Routed <RFC-1483>

MPoA/Routed mode complies with IETF RFC-1483 Multiprotocol Encapsulation over ATM Adaptation Layer 5. In this mode, the modem acts as a routing device, and, when configured to, implements a NAT function for users to assign virtual IPs to their PCs.

Enter **2** in the Quick Setup Wizard to set up MPoA/Routed mode.



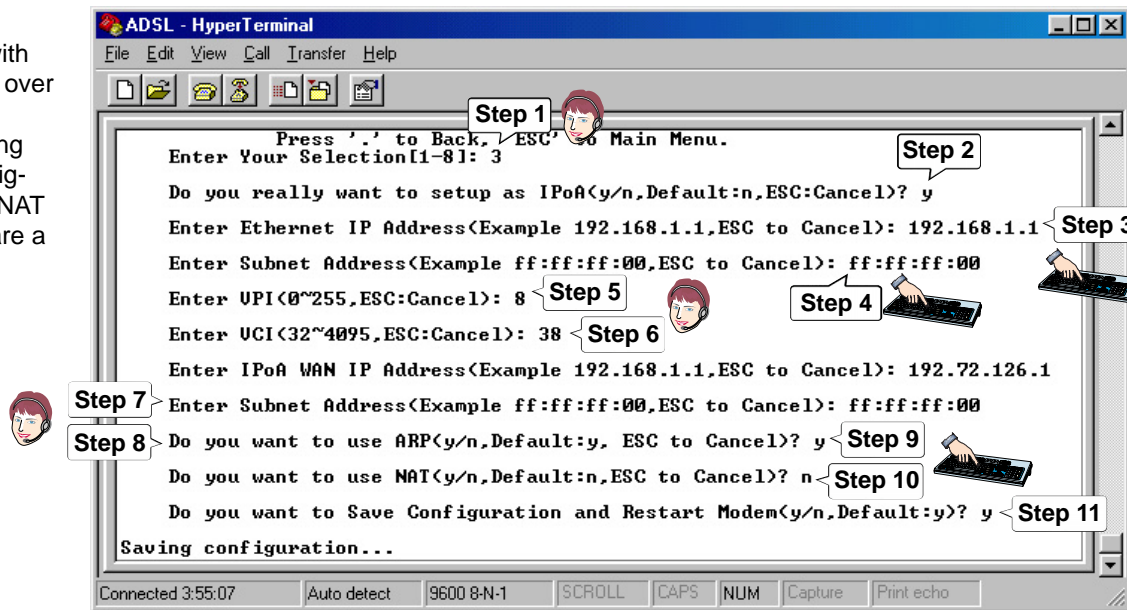
**Note for Step 8:** The subnet address must consist of hexadecimal numbers.

## 4. Configuring the ADSL Modem

### 4.2.3 IPoA <RFC-1577>

IPoA mode complies with the IETF RFC-1577 IP over ATM. In this mode, the modem acts as a routing device and, when configured to, implements a NAT function for PCs to share a single real IP.

Enter **3** in the Quick Setup Wizard to set up IPoA mode.



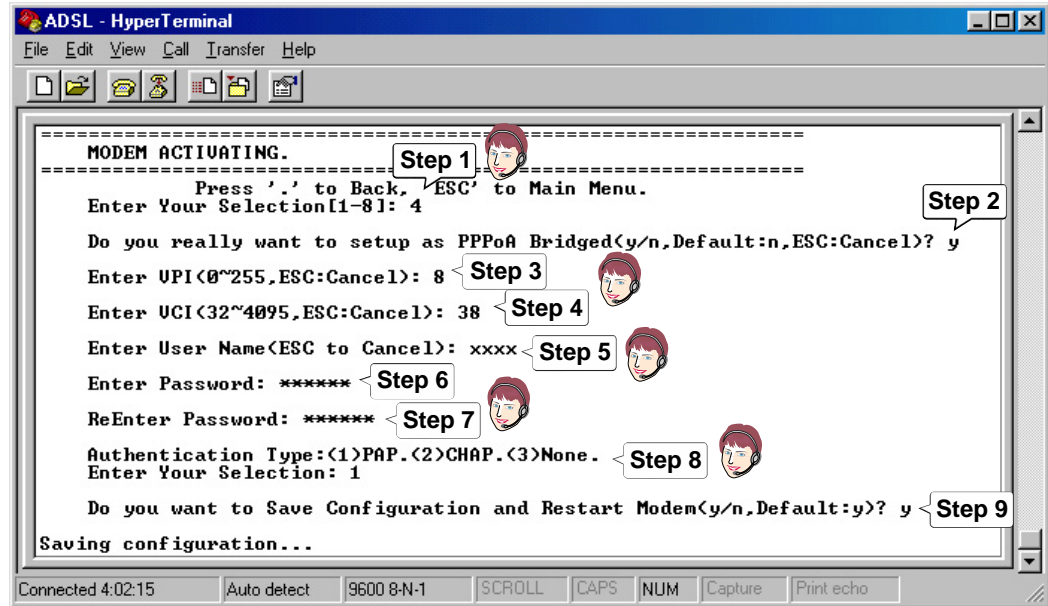
**Note for Step 7:** The subnet address must consist of hexadecimal numbers.



## 4. Configuring the ADSL Modem

### 4.2.4 PPPoA/Bridged <RFC-2364> Enter 4 in the Quick Setup Wizard to set up PPPoA/Bridged mode.

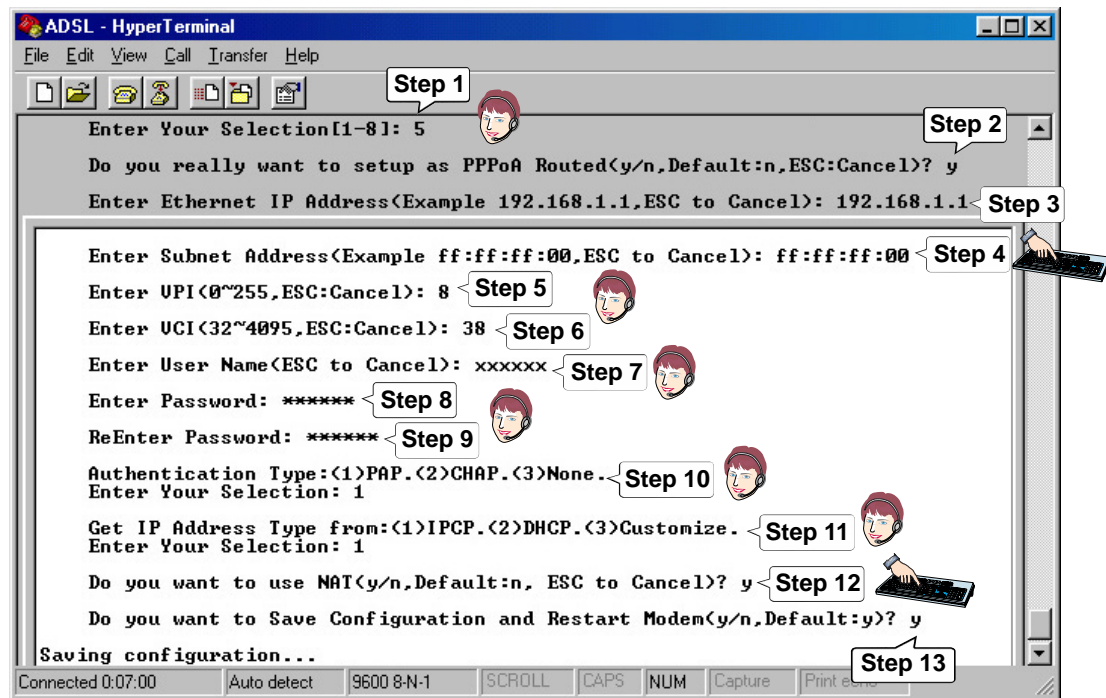
PPPoA/Bridged mode complies with IETF RFC-2364 PPP over ATM. In this mode, the modem acts as a bridging device, and allows users to enter their user names and passwords to log on to the server's network. This mode also supports authentication protocols (PAP, CHAP) and different IP control protocols (IPCP, DHCP).



## 4. Configuring the ADSL Modem

### 4.2.6 PPPoA/Routed <RFC-2364> Enter 5 in the Quick Setup Wizard to set up PPPoA/Routed mode.

PPPoA/Routed mode complies with IETF RFC-2364 PPP over ATM. In this mode, the modem acts as a routing device, and allows users to enter their user names and passwords to log on to the server's network. This mode also supports authentication protocols (PAP, CHAP), different IP control protocols (IPCP, DHCP), and a NAT function for PCs to share a real IP.



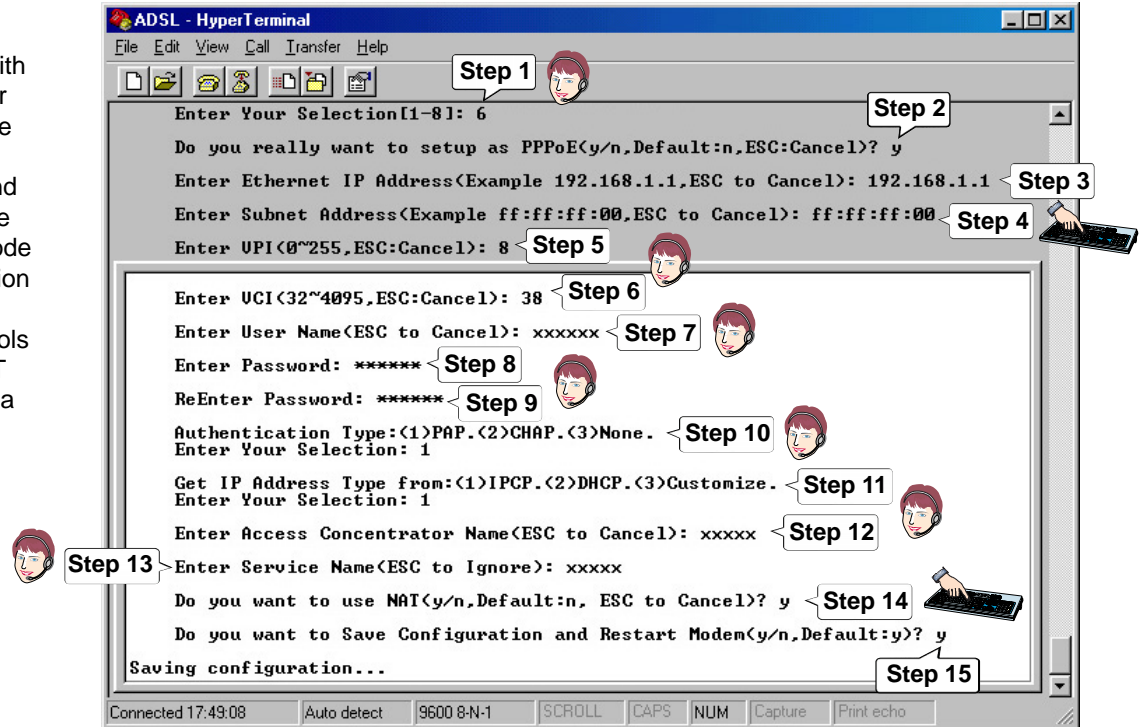
**Note for Step 4:** The subnet address must consist of hexadecimal numbers.

## 4. Configuring the ADSL Modem

### 4.2.7 PPPoE <RFC-2516>

PPPoE mode complies with IETF RFC-2516 PPP over Ethernet. In this mode, the modem allows users to enter their user names and passwords to log on to the server's network. This mode also supports authentication protocols (PAP, CHAP), different IP control protocols (IPCP, DHCP), and a NAT function for PCs to share a real IP.

Enter **6** in the Quick Setup Wizard to set up PPPoE mode.



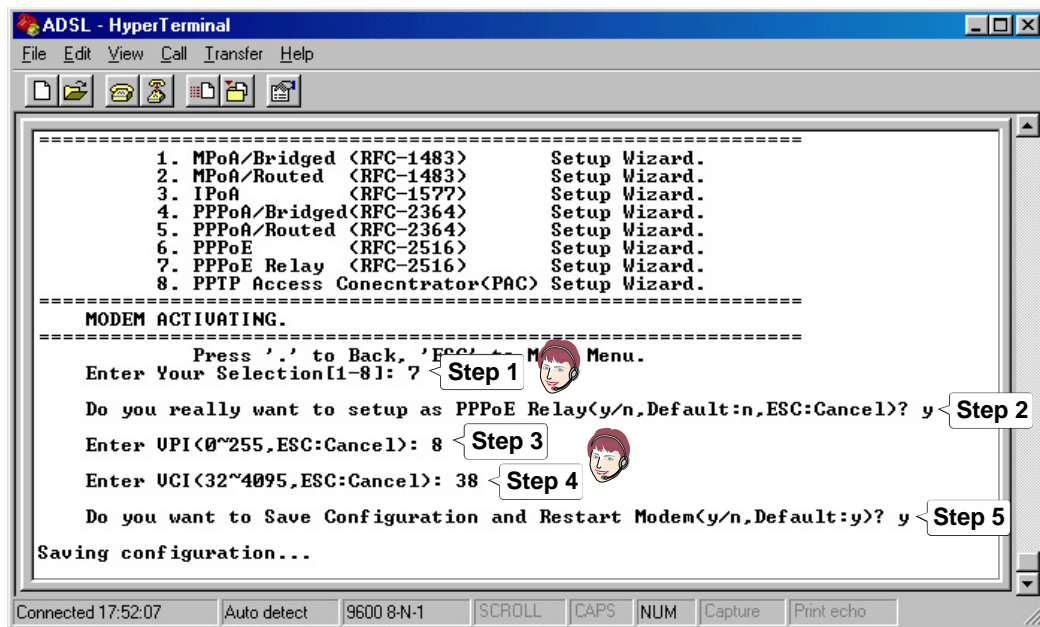
**Note for Step 4:** The subnet address must consist of hexadecimal numbers.

## 4. Configuring the ADSL Modem

### 4.2.8 PPPoE Relay <RFC-2516>

PPPoE mode complies with IETF RFC-2516 PPP over Ethernet. In this mode, the modem allows users to use other software solutions to implement the PPPoE client function.

Enter 7 in the Quick Setup Wizard to set up PPPoE Relay mode.

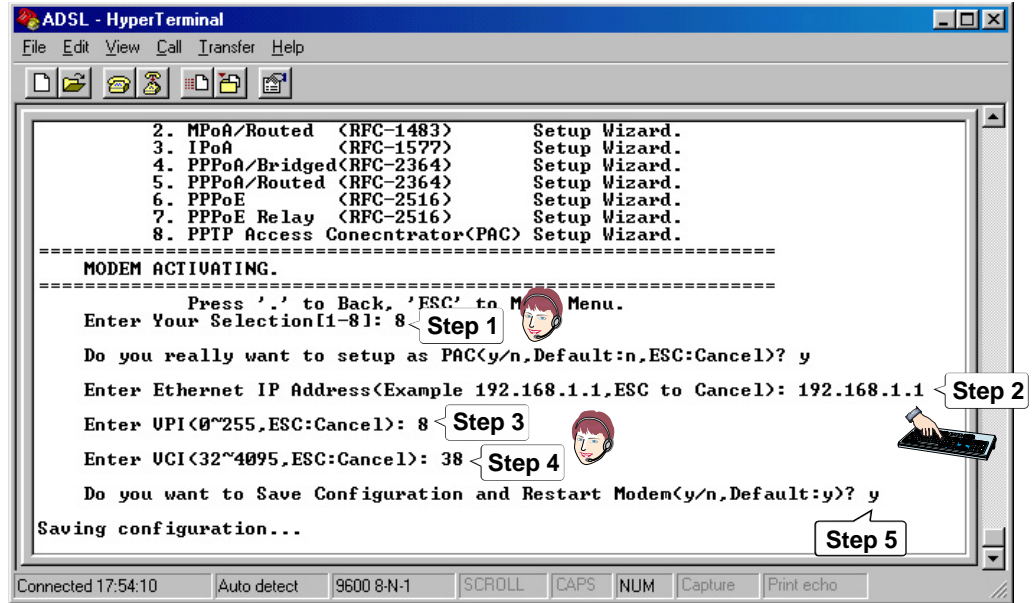


## 4. Configuring the ADSL Modem

### 4.2.9 PPTP Access Concentrator <PAC>

PPTP Access Concentrator mode supports Virtual Private Network (VPN) with the latest PPTP technology. It allows remote users to log on to a private network through the Internet or other networks.

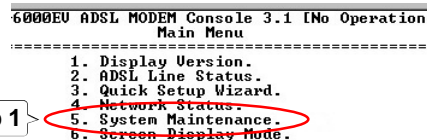
Enter **8** in the Quick Setup Wizard to set up PPTP Access Concentrator mode.



### 4.3 Load Factory Default

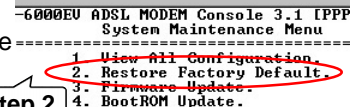
Enter **5** in the Main Menu.

**Step 1**



Enter **2** in the System Maintenance Menu.

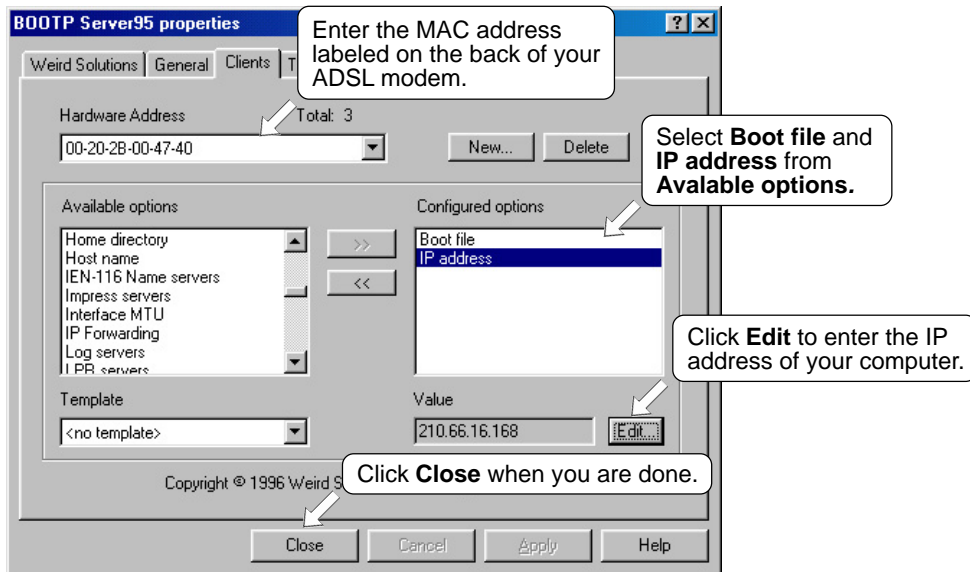
**Step 2**



## 5. Software Upgrade

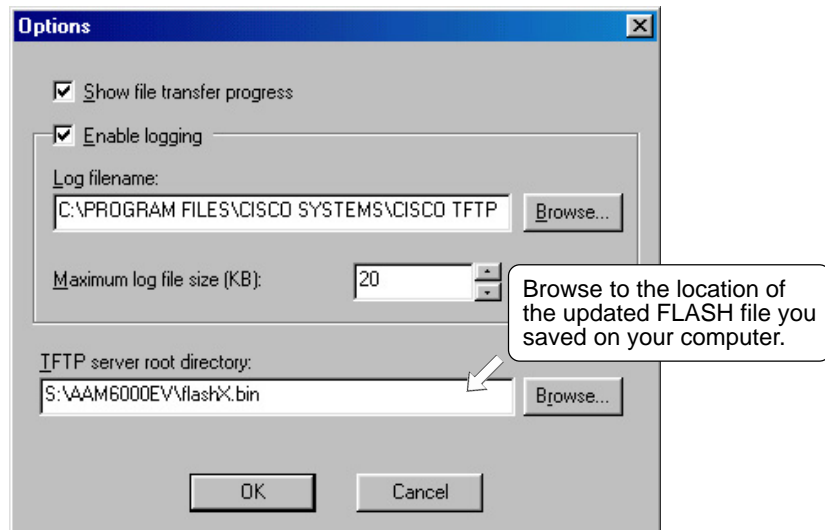
### 5.1 System Update Procedure

1. Download an updated software image file from the Internet (see ASUS Contact Information on the inside of the back cover for details) and save it to your hard drive.
2. Make sure the modem is connected to your PC through the Ethernet interface and the Console port on the modem is connected to your PC's COM port.
3. Run a terminal emulation program such as HyperTerminal.
4. Run a BOOTP server program such as Weird Solutions' BOOTP Server95, which works on Windows 95/98 as well as Windows NT. Configure your BOOTP server as shown below.



### 5.1 System Update Procedure (Cont')

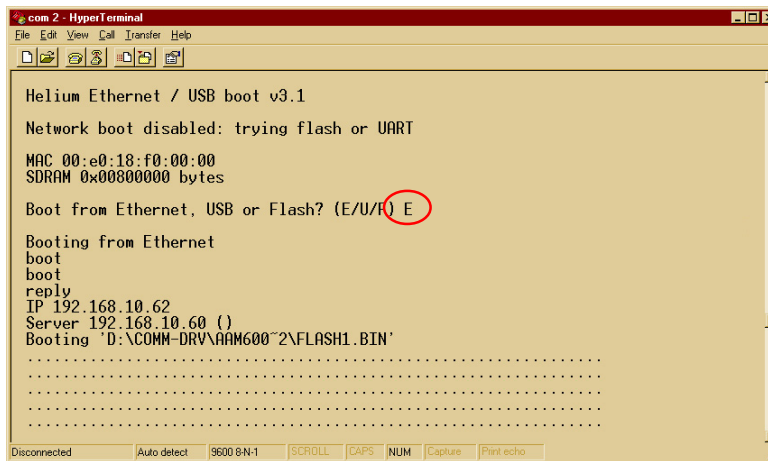
5. Run a TFTP server program such as Cisco TFTP Server.



## 5. Software Upgrade

### 5.1 System Update Procedure (Cont')

6. Press the reset button on the modem and at the same time press the asterisk key <\*> in your terminal emulation program. When a question appears asking you to "Boot from Ethernet, USB or Flash", enter **E** since the modem is connected to your computer through the Ethernet interface.



```
com 2 - HyperTerminal
File Edit View Call Transfer Help

Helium Ethernet / USB boot v3.1

Network boot disabled: trying flash or UART

MAC 00:e0:18:f0:00:00
SDRAM 0x00800000 bytes

Boot from Ethernet, USB or Flash? (E/U/F) E

Booting from Ethernet
boot
boot
reply
IP 192.168.10.62
Server 192.168.10.60 {}
Booting 'D:\COMM-DRV\AAH600~2\FLASH1.BIN'

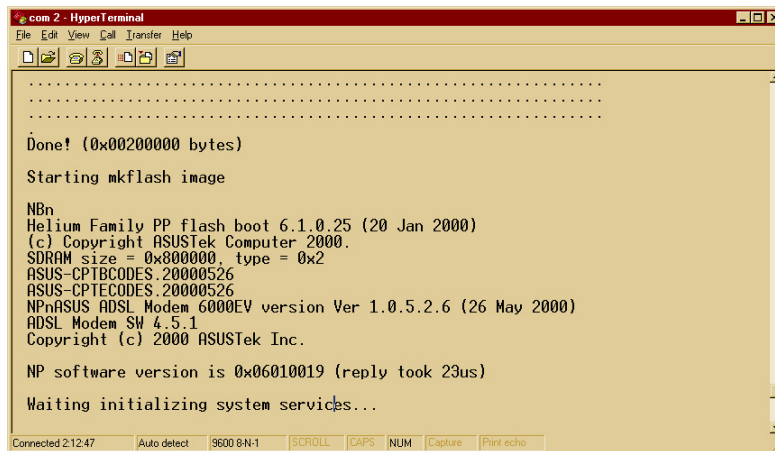
.....
.....
.....
.....
.....

Disconnected Auto detect 9600 8N-1 SCROLL CAPS NUM Capture Print echo
```

7. The modem will then boot from the Ethernet and automatically start downloading the software image file from the computer.



### 5.1 System Update Procedure (Cont')



```
com 2 - HyperTerminal
File Edit View Call Transfer Help

.....
.....
.....
Done! (0x00200000 bytes)
Starting mkflash image

NBn
Helium Family PP flash boot 6.1.0.25 (20 Jan 2000)
(c) Copyright ASUSTek Computer 2000.
SDRAM size = 0x800000, type = 0x2
ASUS-CPTBCODES.20000526
ASUS-CPTBCODES.20000526
NPNASUS ADSL Modem 6000EV version Ver 1.0.5.2.6 (26 May 2000)
ADSL Modem SW 4.5.1
Copyright (c) 2000 ASUSTek Inc.

NP software version is 0x06010019 (reply took 23us)

Waiting initializing system services...

Connected 2:12:47 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo
```

8. When the file is successfully downloaded, the main menu of the updated console will be launched.
9. In Main Menu, enter **5** for System Maintenance.
10. In System Maintenance Menu, enter **3** for Firmware Update. The software update is now completed.

```
ASUS AAM-6000EV ADSL MODEM Console 3.1 [No Operation Mode]
Main Menu
=====
1. Display Version.
2. ADSL Line Status.
3. Quick Setup Wizard.
4. Network Status.
5. System Maintenance.
6. Screen Display Mode.
7. Reset Modem.
8. Exit User Mode Console.
=====

ASUS AAM-6000EV ADSL MODEM Console 3.1 [PPPoE Routed]
System Maintenance Menu
=====
1. User All Configuration.
2. Restore Factory Default.
3. Firmware Update.
4. BootROM Update.
=====
```

**NOTE:** If Boot ROM update is required as part of the software upgrade, it will be specified on the ASUS web site where you download the updated software image. Then please refer to the web site for detailed Boot ROM update procedures.

## ***Appendix A: Product Certifications***

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### **FCC** (Federal Communications Commission Statement)

This ASUS AAM6000EV ADSL Modem has been tested and found to comply with the limits for a class B personal computer and peripherals, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this unit does cause harmful interference to radio or television reception, which can be determined by turning the unit off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

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### **UL**

This product meets all safety requirements per UL-1950 Type 3 standard.

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### **CE**

This certificate of conformity is based on an evaluation of the AAM6000EV product that is in compliance with the Low Voltage Directive 73/23/EEC and the Amendment Directive 93/68/EEC.

## ***Appendix B: Product Specifications***

<b>ADSL Specifications</b>	
<b>Line Coding</b>	<ul style="list-style-type: none"><li>• Discrete Multi-Tone (DMT)</li></ul>
<b>Standards Compliance</b>	<ul style="list-style-type: none"><li>• Full rate ADSL ANSI T1.413 Issue 2</li><li>• ITU G.992.1 (G.dmt)</li><li>• Splitterless ITU G.992.2 (G.lite)</li></ul>
<b>Data Rate</b>	<ul style="list-style-type: none"><li>• Maximum transmission rate: Downstream up to 8Mbps Upstream up to 800Kbps</li></ul>
<b>Rate Adaption</b>	<ul style="list-style-type: none"><li>• Data rate auto-negotiation in 32Kbps increments</li></ul>

<b>ATM Specifications</b>	
<b>ATM Adaption Layer</b>	<ul style="list-style-type: none"><li>• Supports AAL5</li></ul>
<b>ATM Signaling</b>	<ul style="list-style-type: none"><li>• ATM Forum UNI3.0, 3.1, and UNI4.0</li></ul>
<b>VCs</b>	<ul style="list-style-type: none"><li>• Supports multiple Permanent Virtual Circuits (PVCs)</li></ul>
<b>Service Class</b>	<ul style="list-style-type: none"><li>• CBR, UBR</li></ul>
<b>OAM</b>	<ul style="list-style-type: none"><li>• ITU-T I.610 OAM Principles and Functions (including F4/F5) loop</li></ul>

## ***Appendix B: Product Specifications***

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<b>Basic Protocol &amp; RFC</b>	
<b>RFC 1483</b>	Multiple protocol encapsulation over AAL5 <ul style="list-style-type: none"><li>• Supports Logical Link Control (LLC) encapsulation</li><li>• Supports VC-based multiplexing</li></ul>
<b>RFC 2364</b>	PPP over AAL5 <ul style="list-style-type: none"><li>• Supports LLC encapsulation</li><li>• Supports VC-based multiplexing</li><li>• Supports VPN</li></ul>
<b>RFC 2516</b>	PPP over Ethernet <ul style="list-style-type: none"><li>• Supports VPN</li></ul>
<b>RFC 1577</b>	Classical IP and ARP over ATM
<b>RFC 1661</b>	PPP Link Control Protocol (LCP)
<b>RFC 1332</b>	Internet Protocol Control Protocol (IPCP)
<b>RFC 1334</b>	PPP Authentication Protocol (PAP)
<b>RFC 1994</b>	PPP Challenge Handshake Authentication Protocol (CHAP)
<b>RFC 792</b>	Internet Control Message Protocol (ICMP)
<b>802.1 d</b>	Spanning-tree bridge

## ***Appendix B: Product Specifications***

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<b>Routing Function</b>	
<b>RFC 1058, 1723</b>	Routing Information Protocol (RIP, RIPv2) <ul style="list-style-type: none"><li>• Packet Filtering for the In/Out Packets</li></ul>
<b>RFC 1631</b>	Network Address Translation (NAT) <ul style="list-style-type: none"><li>• Supports FTP, mail, Telnet, HTTP</li><li>• Supports Netmeeting</li></ul>
<b>RFC 2131</b>	Dynamic Host Configuration Protocol (DHCP) <ul style="list-style-type: none"><li>• Supports DHCP server and client</li></ul>
<b>VPN</b>	Virtual Private Networks <ul style="list-style-type: none"><li>• Supports Point-to-Point Tunneling Protocol (PPTP)</li></ul>

## ***Appendix B: Product Specifications***

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<b>Hardware Specification</b>	
<b>Console Interface</b>	• Menu-driven user interface
<b>Console Access</b>	• Via RS-232 interface
<b>Interface port</b>	<ul style="list-style-type: none"><li>• LAN: 10Base-T Ethernet (RJ-45)</li><li>• WAN: ADSL line (RJ-11)</li><li>• USB (optional)</li><li>• Console management: RS-232</li></ul>
<b>Dimensions (H x W x D )</b>	• 34.60 x 202.95 x 182.50mm
<b>Weight</b>	• 470g
<b>Power Consumption</b>	• 10W (max.)
<b>DC Input Voltage</b>	• DC +5V
<b>Operating Temperature</b>	• 32° ~ 104° F (0° ~ 40° C)
<b>Non-operating Temp.</b>	• -4° ~ 149° F (-20° ~ 65° C)

## ***Appendix C: ADSL Acronyms***

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<b>ADSL</b>	Asymmetric Digital Subscriber Line
<b>ANSI</b>	American National Standards Institute
<b>ARP</b>	Address Resolution Protocol
<b>ATM</b>	Asynchronous Transfer Mode
<b>CHAP</b>	Challenge-Handshake Authentication Protocol
<b>DHCP</b>	Dynamic Host Configuration Protocol
<b>DMT</b>	Discrete Multi-Tone
<b>DSLAM</b>	Digital Subscriber Line Access Multiplexer
<b>IETF RFC</b>	Internet Engineering Task Force Request for Comments
<b>IPCP</b>	Internet Protocol Control Protocol
<b>IPoA</b>	IP over ATM
<b>ITU</b>	International Telecommunication Union
<b>ITU-T</b>	ITU Telecommunication Standardization Sector
<b>MPoA</b>	Multiprotocol Encapsulation over ATM Adaptation Layer 5 (AAL5)
<b>NAT</b>	Network Address Translation
<b>PAC</b>	PPTP Access Concentrator
<b>PAP</b>	Password Authentication Protocol

## ***Appendix C: ADSL Acronyms***

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<b>POTS</b>	Plain Old Telephone Service
<b>PPP</b>	Point-to-Point Protocol
<b>PPPoA</b>	PPP over ATM Adaptation Layer 5
<b>PPTP</b>	Point-to-Point Tunneling Protocol
<b>PPPoE</b>	PPP over Ethernet
<b>PSTN</b>	Public Switched Telephone Network
<b>Telco</b>	Telephone Company
<b>VCI</b>	Virtual Circuit Identifier
<b>VPI</b>	Virtual Path Identifier
<b>VPN</b>	Virtual Private Network